



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,702	06/27/2003	Thomas S. Ellis	DP-309231	9673
22851	7590	04/04/2005	EXAMINER	
DELPHI TECHNOLOGIES, INC.			NGUYEN, DILINH P	
M/C 480-410-202			ART UNIT	
PO BOX 5052			PAPER NUMBER	
TROY, MI 48007			2814	

DATE MAILED: 04/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/608,702

Applicant(s)

ELLIS ET AL.

Examiner

DiLinh Nguyen

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2,4-14 and 16-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2,4-14,16-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 2 and 4-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaminaga et al. (U.S. Pat. 6257215) in view of Shin et al. (U.S. Pat. 6593404).

- Regarding claim 4, Kaminaga et al. disclose an encapsulated, overmolded and/or underfilled electrical component, comprising:

an electrical component encapsulated 1, overmolded and/or underfilled with a polymeric composite including a synthetic resin matrix 7 and inorganic filler particles substantially uniformly distributed in the matrix (fig. 1a, column 6, lines 10-15).

Kaminaga et al. fail to disclose the particles having a platelet structure and the inorganic filler content being 20 percent or less by weight based on the weight of the polymeric composite.

However, Shin et al. disclose a semiconductor device comprising particles having a platelet structure defined by opposite substantially flat and substantially parallel faces (the inorganic fillers such as montmorillonite) (column 3, lines 60), the inorganic filler content being 20 percent or less by weight based on the weight of the polymeric composite (the inorganic filler is 0 to 50 parts by weight based on 100 parts by weight of the polymeric composite) (column 6, lines 57-62). Therefore, it would have been obvious to one having ordinary skill in

Art Unit: 2814

the art at the time the invention was made to substitute the particles of Kaminaga et al. by having inorganic fillers such as montmorillonite, as taught by Shin et al., in order to provide excellent stress cracking resistance and improve heat resistance (column 2, lines 54-56) and improve adhesion for the semiconductor package. Moreover, selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co., Inc. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

- Regarding claim 2, Kaminaga et al. disclose wherein the electrical component is a substrate 1 having an electrical circuit formed on at least one surface of the substrate and at least one semiconductor chip 3 electrically connected to the electrical circuit (fig. 1A).
- Regarding claim 5, Shin et al. disclose the inorganic filler is 0 to 50 parts by weight based on 100 parts by weight of the polymeric composite (column 6, lines 57-62).
- Regarding claims 6-7, Shin et al. disclose wherein the filler is a smectite clay mineral and wherein the smectite clay mineral is montmorillonite (column 3, line 60).
- Regarding claims 8-9, Kaminaga et al. disclose the matrix is an epoxy resin (column 3, lines 67 and column 6, line 10).
- Regarding claim 10, Shin et al. disclose that the device comprises a thermoplastic resin (abstract).
- Regarding claim 11, Shin et al. disclose the resin is selected from the group consisting of polycarbonate and copolymer (abstract).

Art Unit: 2814

3. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaminaga et al. (U.S. Pat. 6257215) in view of Shin et al. (U.S. Pat. 6593404) and further in view of Capote et al. (U.S. Pat. 6335571).

As discussed in details above, the combination of Kaminaga et al. and Shin et al. substantially disclose all the limitations as claimed above except for the composite has a CTE from about 5 to 20 ppm/°C.

However, Capote et al. disclose a semiconductor device comprising a composite has a CTE from about 5 to 20 ppm/°C (cover fig., column 8, lines 15-20). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of the above combination to minimize the stress on the solder joint for the composite, as shown by Capote et al. (column 8, lines 17-19).

4. Claims 13-14 and 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaminaga et al. (U.S. Pat. 6257215) in view of Shin et al. (U.S. Pat. 6593404).

- Regarding claim 13, Kaminaga et al. disclose an encapsulated, overmolded and/or underfilled electrical component, comprising:
an electrical component encapsulated 1, overmolded and/or underfilled with an epoxy package matrix 7 and an inorganic particulate filler (fig. 1a, column 6, lines 10-15).

Kaminaga et al. fail to disclose the epoxy package 7 is a thermoplastic resin matrix.

Shin et al. disclose a semiconductor device comprising a thermoplastic resin composition including an inorganic particulate filler (abstract). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select the thermoplastic resin composition as known material, as taught by Shin et al. into the device structure of Kaminaga et al. for forming a polymeric composite, such the thermoplastic resin would provide excellent stress cracking resistance and improve heat resistance (column 2, lines 54-56). Moreover, selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co., Inc. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

- Regarding claim 14, Kaminaga et al. disclose wherein the electrical component is a substrate 1 having an electrical circuit formed on at least one surface of the substrate and at least one semiconductor chip 3 electrically connected to the electrical circuit (fig. 1A).
- Regarding claims 16-17, Shin et al. disclose the inorganic filler is 0 to 50 parts by weight based on 100 parts by weight of the polymeric composite (column 6, lines 57-62).
- Regarding claims 18-19, Shin et al. disclose the filler is montmorillonite (column 3, lines 55-60).
- Regarding claim 20, Shin et al. disclose the resin is selected from the group consisting of polycarbonate and copolymer (abstract).

Art Unit: 2814

5. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaminaga et al. (U.S. Pat. 6257215) in view of Shin et al. (U.S. Pat. 6593404) and further in view of Yu et al. (U.S. Pat. 5153657).

As discussed in details above, the combination of Kaminaga et al. and Shin et al. substantially disclose all the limitations as claimed above except for the inorganic filler is glass spheres.

Yu et al. disclose an inorganic filler is glass spheres (column 13, lines 45) and wherein an average diameter of from about 1 micrometer to about 3 micrometers (column 14, lines 36-37). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select glass spheres as known material, as taught by Yu et al. into the device structure of the above combination for forming the inorganic fillers as being claimed since the glass spheres would maintain good conformance in the lateral direction (column 12, lines 31-32). Moreover, selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co., Inc. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (571) 272-1712. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2814

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DLN

A handwritten signature in black ink, appearing to read 'Hoai Pham', with a long horizontal flourish extending to the right.

HOAI PHAM
PRIMARY EXAMINER